October-November 1969

EMO

Federal-Provincial Briefing

The Canadian Telephone Network

Hurricane Camille—1969 (Part I)

Netherlands Civil Defence

Defense vs Retaliation

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CANADA EMERGENCY MEASURES ORGANIZATION

EMO
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The EMO NATIONAL DIGEST publishes six editions annually to provide current information on a broad range of subjects dealing with civil emergency planning. The magazine is published in English and French and may be obtained by writing to the Canada Emergency Measures Organization, Ottawa 2, Ont.

In addition to publishing articles which reflect Canadian Government policy the Digest may also publish articles by private individuals on subjects of current interest to the emergency measures programme. The views of these contributors are not necessarily subscribed to by the Federal Government.

Editor: A. M. STRTON

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FEDERAL–PROVINCIAL BRIEFING

Senior federal and provincial government officials headed by the Honourable Léo Cadieux, Minister of National Defence, and the Honourable Jean J. Bertrand, Premier of Quebec, met September 30, 1969, at the Canadian Forces Base Valcartier to exchange briefings on civil emergency planning activities and discuss the development of programs of mutual interest in the fields of civil protection and emergency measures.

The conference was primarily designed to present Quebec cabinet ministers and deputy ministers with information on emergency measures planning by the two levels of government. The provincial delegation of about 30 consisted of ministers and senior officials of departments which have peacetime emergency planning responsibilities.

Mr. Cadieux, to whom the Canada Emergency Measures Organization is responsible, opened the conference with a briefing on the development of federal programs and objectives which are considered essential to the survival of Canadians, continuity of government, and resources management in wartime.

Honourable Remi Paul, Minister of Justice and Provincial Coordinator of Civil Protection dealt with current activities and plans by his department and government.

Following are the texts of addresses presented by Mr. Cadieux and Mr. Paul.

Address by the minister of national defence

I am grateful for this opportunity to review with you some of the principles underlying our approach to the civil emergency program in which we are participating jointly.

The defence of the nation comprises two major components — military defence measures designed to preserve the integrity of our territory, and, civil measures designed to protect the people and reduce the vulnerability of the entire civil structure.

Last year, the need for a complete and harmonious co-ordination of these two inter-dependent components was recognized and by the addition of the Canada Emergency Measures Organization to my Department, responsibility for civil emergency planning became part of my overall responsibility.

The need for civil emergency measures has its roots in the same international circumstances which necessitate military defence and which have led to Canada's continued participation in collective defence arrangements such as the continental defence of North America and NATO.

While the likelihood of war now appears to be significantly reduced, nevertheless, as long as the major powers maintain the arsenals which they do, fe must consider that some hazard remains which, in the case of North America, is mainly from nuclear weapons. No military defence at present guarantees complete impenetrability and, therefore, a nuclear attack would cause large numbers of civilian casualties, seriously interfere with the machinery of goverment at all levels, and disrupt industry and the management of national resources. The implementation of the precautionary measures being developed will, however, in such an eventuality, help assure the survival of an even larger section of the population than would in any case survive. Modern weapons are such that even an attack upon the United States alone could result in serious damage and casualties to significant areas of Canada.

The Canada Emergency Measures Organization exists to stimulate and coordinate, throughout the nation, the planning and preparations which are desirable to meet such a hazard.

A number of considerations have dictated our approach:

1. the available resources of the nation to meet the need are immense, however, their full potential can only be realized if effective plans and preparations to conserve and use them are made in peacetime;
2. although the reduction of vulnerability demands emergency preparations over a very wide range of national activities, these are such that even the lowest level of preparations produces significant results and can contribute materially to the overall defence of the nation;
3. civil emergency measures are related to the weapon effects and are not concerned with weapon delivery systems. For this reason, they are not subject to frequent phases of obsolescence and are likely to remain valid and effective for a great many years.

The Canada Emergency Measures Organization accordingly concentrates on measures directed towards the protection of life, and towards arrangements by which government may continue to provide guidance, leadership and essential service to the public, and by which it can conserve and effectively use our national resources.

Significant steps have been made in each of these areas. We have planned to enhance the individual's ability to survive a nuclear attack by establishing

methods of warning him of the imminence of such attack, of monitoring the hazards he will encounter and informing him of these and instructing him in ways to protect himself against their effects. We have planned the continuity of the essential government services such as the maintenance of law and order and the provision of essential health and welfare services at the federal, provincial and municipal levels. We have ensured the continity of government leadership through decentralization and delegation of authority and through the establishment of protected emergency headquarters and communications. We have also established plans, in close co-operation with representatives of industry, to provide for effective management of the economy in periods of emergency through the drafting of appropriate emergency orders and the development of war-time systems to regulate trade, to control production and allocate scarce commodities. In the development of these emergency measures EMO maintains close working relationships with all federal departments and with all provinces and territories. In addition, it must be appreciated that the Canadian Forces make a significant contribution to our civil readiness by their arrangements to disseminate the attack warning, by their assistance in the monitoring of weapon effects, by providing federal emergency communications and by making military resources available for our peace-time and war-time emergency operations.

There is, therefore, a very significant national capability already in being and it is my hope that this will grow logically and rationally with our national requirements as the years go by. However, I realize that this is unlikely to be possible unless we in the federal government and you in the provincial governments co-operate harmoniously towards achieving a common goal.

We often find in our discussions with provincial and municipal authorities that one of their major interests in civil emergency planning is its application to peace-time disasters. As you are undoubtedly aware, we have made available the resources and mechanisms provided in civil emergency measures program to cope with peace-time disasters, and I am very much aware of the credibility which effective action in this area lends to the entire program. The Canada Emergency Measures Organization will, therefore, continue to consider the duality of purpose of the plans and preparations which it makes for a war emergency.

Civil emergency measures constitute a program which stretches horizontally across the entire spectrum of

The Honorable Remi Paul, Quebec Minister of Justice and Provincial Coordinator of Civil Protection briefs provincial and federal officials on activities and plans of civil protection. Among the 50 participants were, left to right: The Honourable Jean-Jacques Bertrand, Premier of Quebec; the Honourable Léo Cadieux, Minister of National Defence; Brig.-Gen. R. A. Reid, Commandant 5th Combat Group; Brig.-Gen. J. A. Ross, Commander Quebec Region (behind podium).

During a tour of the Regional Emergency Government Headquarters Valcartier, officials were briefed on the role of the operations room. Here, left to right are: Hon. Remi Paul; Hon. Clément Vincent Minister of Agriculture and Colonization; Premier Jean-Jacques Bertrand; Hon. Léo Cadieux, Hon. Jean-Marie Morin, A/Minister of Education and Mr. Elgin Armstrong, Deputy Minister, Department of National Defence.

federal government and vertically through public and private sectors of the economy and through the provincial and municipal governments to the individual citizen. It is only a dynamic program when it receives purposeful direction and support from those of us in authority and cooperative participation by all those involved in it.

Financial restrictions have forced us to be ever more aware of the need to derive the maximum benefits from the limited resources put at our disposal and in this endeavour we have advocated the adoption of new management systems to help control anl coordinate the complex civil emergency programs which we share with the provinces. Hopefully, this will permit us to develop and maintain a better balanced capability across the nation by identifying the anomalies and gaps in the various programs. It should also permit us to share in each other's successes by identifying the most rewarding methods found, and by their general application we should get the best returns from our collective efforts.

We are gratified that in the Province of Quebec the new management concepts have been enthusiastically adopted and the reorganization of the PCP now in progress promises to provide a more effective civil emergency program by providing better orientation and utilization of the resources at its disposal. We have vested interest in your success as you have in ours and appreciate the cooperation so displayed.

Address by Hon. Remi Paul

Hon. Léo Cadieux has described to you the operation of the Emergency Measures Organization of Canada in peace time, as well as the measures which would be required to ensure the functions of the federal government in war or during a state of national emergency.

As Minister responsible for Civil Protection in the Province of Québec it is incumbent on me to describe the measures which would have to be taken to ensure the continuance of the Government of Québec should a state of emergency arise, as well as the role which the Civil Protection organization fills with respect to the departments and agencies of the government of Québec.

We are, here, at the site of the Valcartier regional emergency government headquarters.

If, unhappily, Canada were the target for nuclear attack, the resulting catastrophic disorganization of society

would have to be countered by united and foolproof government action.

Public authority which, in peace time, is shared between the two levels of government, would be discharged by a single government during a state of emergency.

The government having jurisdiction over the territory of the Province of Québec would be called a "regional government", a far from normal type of government, and one which would act in what are normally both federal and provincial spheres.

Because of this, the emergency government for the territory of Québec, which would assemble here, would be composed of federal and provincial representatives.

Québec has been divided into 8 zones, each of which has an emergency government headquarters, comparable to this one, staffed by federal and provincial government representatives. This is the case for cities which are particularly vulnerable, such as Montréal and Québec, and Hull, because of its proximity to the national capital.

In addition to these locations, which are relatively well protected and provided with the best possible telecommunications system, the government of Québec has to establish a "withdrawal centre" for provincial administration.

This, very briefly, is an outline of the regional emergency government which would be established in the event of a nuclear attack.

You have been provided with a copy of a proposal for and emergency government which suggests, after examination by the government of Québec, concrete arrangements providing for its future existence. This emergency regional government assumes the participation of departments which would be essential to the operation of regional government. It would be comprised of ministers, departmental representatives, civil servants, and specialists from private enterprise whose presence would be considered essential, here, and who should be prepared to carry out their emergency role. They are:

The Prime Minister
The Minister of Justice
The Minister of Health
The Minister of Welfare
The Minister of Highways
The Minister of Municipal Affairs
The Minister responsible for Civil Protection

Also included are civil servants from the following departments and government agencies:

Justice
Municipal Affairs
Health
Welfare and Family
Agriculture
Finance
Lands and Forests
Industry and Commerce
Labour
Public Works
Highways
Transport and Communications
Québec Provincial Police
Directorate General of Fire Prevention
Civil Protection

Consideration must also be given to Québec's participation in establishing zone emergency governments and the provincial administration in the withdrawal centre located at Shawinigan. At this stage I would not want to discuss the question of the administration of groups of municipalities in which, to meet certain requirements, it would be necessary to ensure the presence of representatives from Québec and from the federal government.

This brief outline indicates the complexity of providing for the continued operation of public authority during a state of emergency.

However, this is not all; arrangements have to be made for the maximum utilisation of existing human and material resources in an emergency; steps must be taken to increase their number so that they can afford the emergency government more powerful and effective means of action, bearing in mind the extreme difficulty under which they would have to perform.

The government of Québec proposes to implement Project Phoenix which, after its approval, will become the five year programme for the Québec Emergency Measures Organization.

I should like to take advantage of this opportunity to outline to you some of the objectives of this project, which have been decided after extensive studies made in Canada and the U.S.A. These objectives affect the government of Québec, since they require immediate action on its part.

1. Prepare preventitive evacuation — the exodus of 1,230,000 persons;
2. Inform 2 million families about emergency measures;
3. Establish 4,000 radioactivity detection posts, and 800 radiological data interpretation centres;
4. Protect a large part of the population, whose number has not yet been determined, through the provision of shelters against radioactivity;
5. Prepare for notifying 6 million persons about an emergency;
6. Prepare for the operation of:
   a. 165 emergency hospitals;
   b. 200 advanced treatment centres;
   c. 200 assembly units;
   d. 10 public hygiene mobile laboratories;
   e. 10 blood transfusion sub-depots;
   f. 130 emergency clinics;
   and furnish all these units with medical supplies sufficient for 30 days' use, for the treatment of 270,000 seriously wounded persons, and 260,000 slightly injured persons;
7. Receive 1,400,000 people in welfare centres;
8. Train 20,000 people in the emergency roles necessary for continuation of government operations;

(*continued on page 23*) **BRIEFING**

THE CANADIAN TELEPHONE NETWORK

Organized for Emergencies

The following article was prepared for the Digest by Bell Canada.

The Canadian telephone network is a very large complex system serving more than 9,000,000 telephones through the facilities of some 2,000 separate telephone companies. These companies range from small rural co-operatives to large publicly and privately owned systems. Government regulated, they work together providing quality service at reasonable cost within the territories they serve and connect their customers with telephones throughout North America and overseas.

Canadians are the greatest users of telephones in the world. At first, this was primarily to overcome communications barriers imposed by climate and geography. Today, it has become natural to use the telephone freely in all business and social activities. In fact, the telephone has become such a standard part of Canadian culture that without it the country would be thrown into near chaos.

Canadian telephone companies have been aware of the tremendous responsibility they have to maintain telecommunications even in the most extreme emergencies. As a result they have built emergency precautions into the day to day operations of the network.

Telephone companies operate on the principle that successful conversion to emergency operations is dependant on simplicity and the ability to incorporate under emergency conditions the same procedures used on a day-to-day basis.

There are thus two aspects to emergency organization operation of the emergency program under normal conditions and operation of the emergency program under emergency conditions.

The two sub-sections of the telephone organization which are most affected by emergency operations are traffic network management and plant maintenance. Traffic is the voice, data and other communications carried over telephone facilities. Plant refers to cable, microwave towers, switching equipment, buildings, etc. In short, the physical and electronic devices used to transmit communications.

Traffic Network Management

Today more than 300,000 long distance lines criss-cross the continent connecting more than 110,000,000 telephones. This network of electronic highways is organized into a flexible arrangement of telephone circuits so that calls can be completed rapidly. For telephone purposes, the continent is divided into 12 regions, each of which has its own regional switching centre. Two of the regions are in Canada. Each region is in turn divided into sections with sectional switching centres, then primary centres, toll centres and finally end or local offices. The network is programmed to handle any call in a systematic, economical manner with alternate routes provided when the normal one is not available.

Alternate routing helps prevent delays. If the most direct route is operating at full capacity when a caller dials a number, the equipment will search out a free route, often testing four or five alternatives, with no noticeable time lag. For example; a caller in London, Ontario wants to reach Vancouver. There are direct circuits between these two cities because the volume of calling is sufficient to justify a direct group of circuits. When the caller dials the Vancouver number, the switching equipment would first try to complete the call on the direct circuits. If these are busy, the London switching machine would try its circuits to Regina where the call would be routed to Vancouver. If this group is also busy, the call is forwarded to Toronto where the Toronto machines try their circuits to Vancouver and then to Vancouver and then to Regina if the former are occupied. If these circuits are busy, Toronto passes the call to Montreal which trys its Vancouver and then Regina circuits. It is extremely unlikely that all six alternate routes would be fully occupied at the same time. As can be seen, the breakdown of the London to Vancouver circuits due to some natural or other disaster would not eliminate communication between the two cities as would be the case if there were no alternate routing facilities.

Like their concrete counterparts, electronic highways are susceptible to traffic jams should there be a sudden upsurge in calls from a particular city or facility failure. Keeping an eye on the telephone network with its alternate routing and switching equipment are the network managers. They keep a constant record of traffic flow over long distance lines. At each regional centre there are status boards which provide up-to-the-minute information as to how the circuits and switching equipment within the region are operating and also indicate what is happening in the other regions.

All traffic network managers in each of the regional centres are in constant voice contact with one another balancing the needs of the moment with the circuit and switching capabilities of the various regions. These men operate much like air traffic controllers or traffic cops as they direct the flow of telecommunications along the best route.

In times of emergency, these men become especially important. They must keep track of circuits destroyed by natural disasters or enemy attack and route calls around these areas. They must also ensure that rerouting

The Status Board at a Traffic Network Management Centre shows the traffic pattern within the region (on the right) and keeps the network manager up to date on traffic problems in each of the 12 regions that comprise the North American switched network (on the left).

does not overload other circuits causing failures in them.

Traffic network management operates on the intertoll or long distance network. Emergency conditions also place special loads on central offices in local areas. To deal with emergency overloads, most central offices have Line Load Control equipment to ensure that in an emergency, telephone service to the lines essential to disaster relief, public safety and defence is continuous and unimpaired.

The application of Line Load Control means that the essential lines share the switching capacity of a local office and that the traffic flow progresses in an orderly way. Originating service from the lines not considered essential is temporarily suspended. The decision to apply Line Load Control is made by the responsible manager and only in cases of extreme emergency, after all other methods of maintaining essential communications have failed. This means that it is applied very seldom. Line Load Control does not affect calls in progress or incoming calls which are completed even to lines restricted from originating service. This means that the switching equipment in the local office is free to handle essential calls.

In addition to Traffic Network Management and Line Load Control, the telephone companies have built other emergency precautions into the day-to-day operations of the telephone network.

Route Diversity

To guard against complete interruption of service, circuits between two main points traverse more than one route. The minimum acceptable restoration in the event of a route failure, includes all special services and defence circuits as well as nearly 50% of the regular message traffic. Detailed restoration plans are available and have been tested for all main routes throughout the country. The circuits in each traffic and special service group are planned so that they are divided between the available routes as evenly as practicable.

If there are two routes between two points and loading on each is kept reasonably close on a continuing basis, then at least 50% of the traffic will be unaffected by a failure of one of the routes. Three equally-loaded routes means that no more than one-third of the facilities will be out of service at the moment of failure of one route.

Metropolitan Area Junction Planning

Two-thirds of Canada's population lives in 15 metropolitan areas. To obtain maximum survivability and take advantage of the diverse routes serving these areas, a method of by-passing these large centres is used.

Metropolitan areas are obvious targets in a war time situation. In peacetime, dividing the many circuits flowing into an urban area means that a natural disaster is

unlikely to isolate the area as some of the circuits are likely to remain operational.

The main features of Metropolitan Area Junction Planning are:

1. Through circuits by-pass metropolitan centres.
2. The various routes do not cross one another.
3. Junctions are so planned in the vicinity of metropolitan areas that only one route in each direction passes through the common point.
4. Traffic loads on all routes are kept equal so that the loss of any one route or junction will cause only limited failure.

To be effective, a minimum of two, and preferably three, fairly even loaded routes are required in each of the East-West and North-South directions for each metropolitan area. The North and South junctions serve as routing points for East-West traffic while the East and West junctions are routing points for North-South traffic. Each junction has a terminal link joining it to the terminal office. (Figure 1).

The junctions are kept approximately 35 miles apart so a nuclear blast or other major disaster affecting the terminal office would not affect the junction points. Metropolitan Area Junction Planning is in effect throughout Canada and a fundamental plan extending to the year 1990 ensures that it will not be violated.

Terminal Area Protection

"Terminal Area Protection" facilities are designed to provide the authorities in major centres with some means of communicating with the outside world in the event of a major disaster. They are designed to meet only the most basic communication needs of a densely populated area in isolation and emergency conditions where normal routing and switching facilities are incapacitated.

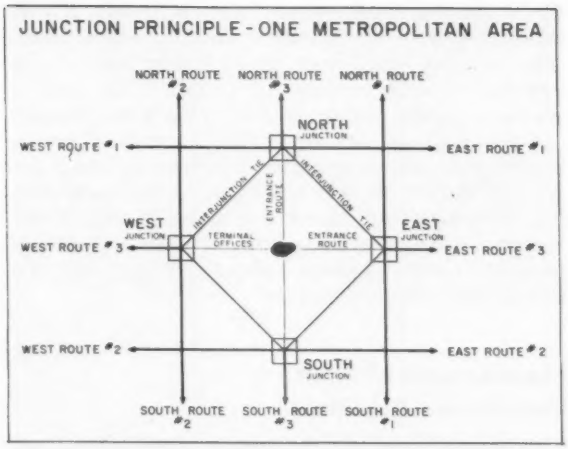
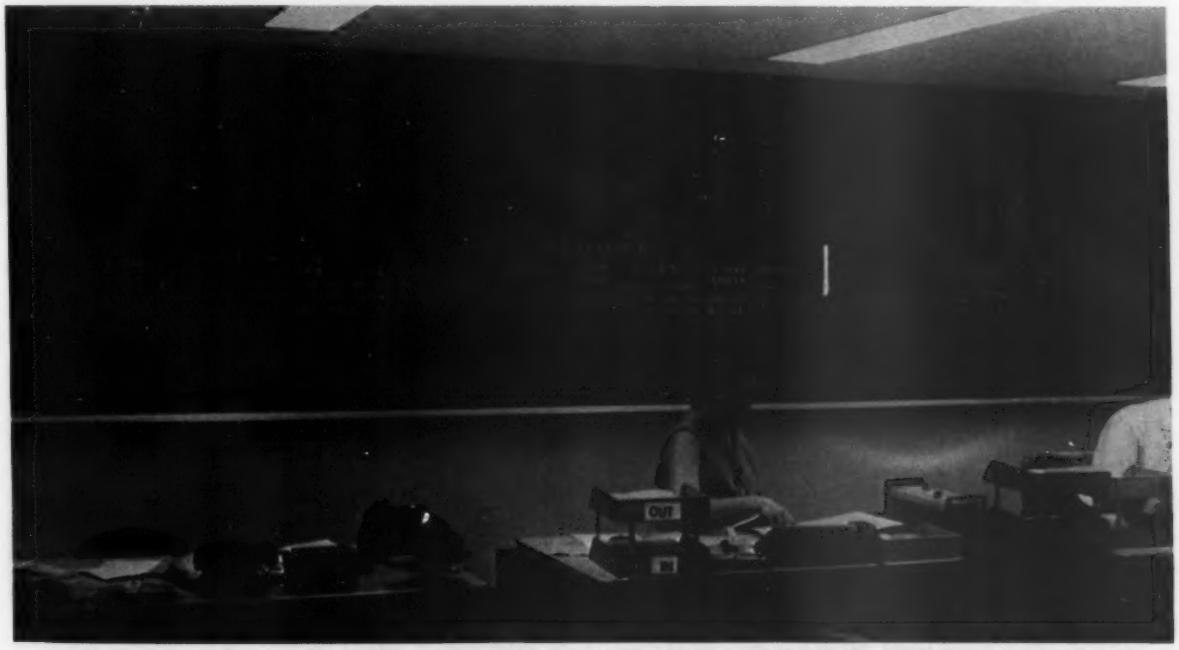


Figure 1

Toll access circuits are normally directed towards the senstitive core area of a community. Terminal Area Protection circuits radiate outwards towards adjacent toll centres. They provide minimum facilities to connect the disaster area with the outside world. Terminal Area Protection access offices are established on the outer fringes of a city on a cable route to an adjacent centre.



Equipment damage and service interruptions in any of the Trans-Canada Telephone System companies are reported to the Status Centre. Each company maintains a similar centre, on a smaller scale, in its own operatings territory.

Under the plan small groups of circuits (usually 12) are established from the Terminal Area Protection access office to a distant toll centre where they terminate at the switchboard. Only persons with an established need to use these circuits in times of disaster know the number.

Operation from the disaster area is automatic; operation from the distant switchboard is manual. The facilities are "hot" at all times and under continuous routine test. The toll centre operator reached by way of the Terminal Area Protection access office has the ability to reach other required points without passing through the affected toll switching machine.

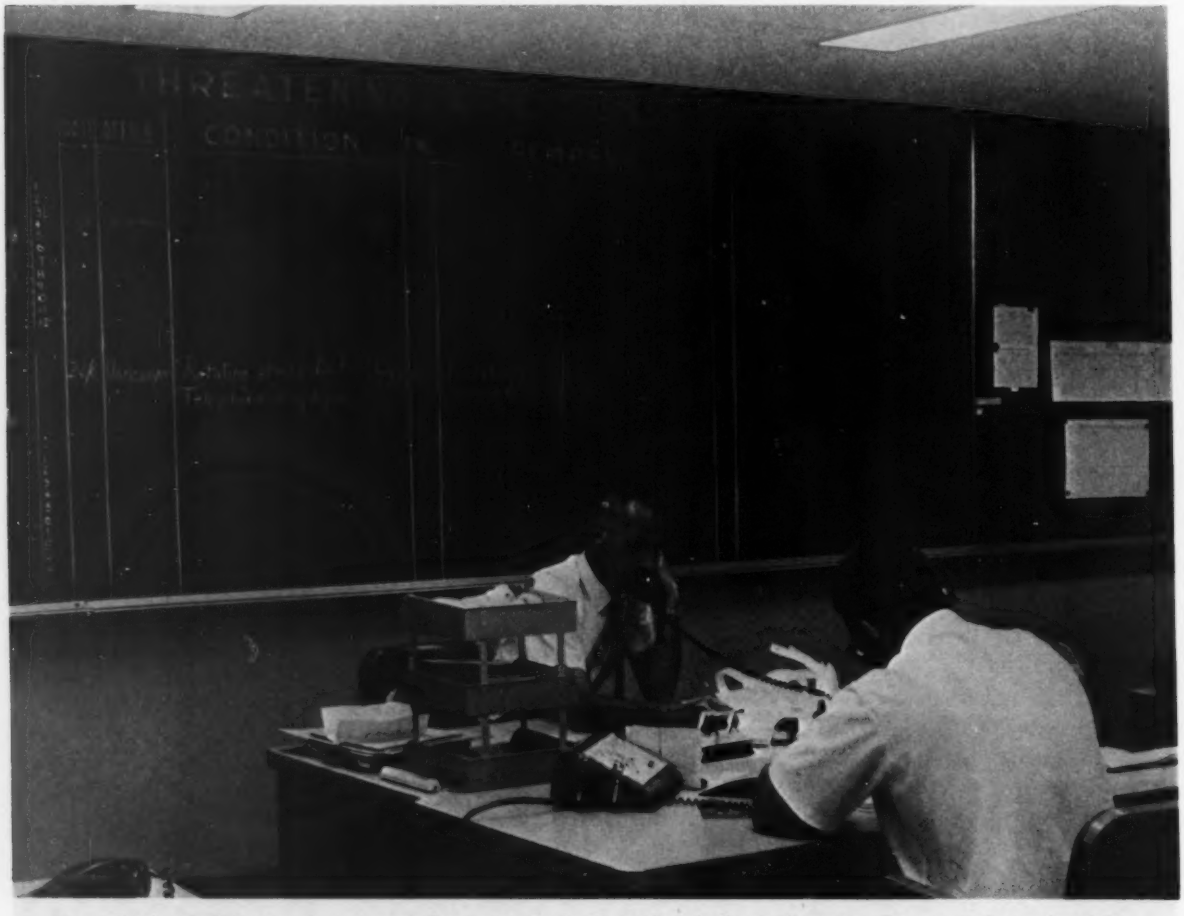
Maintenance of Plant

Under Normal Conditions

Telephone company operating organizations are structured along military lines, with responsibility and authority delegated to various levels of management. To perform normal functions, line operating people are located throughout the country and are held responsible for service within their respective territories. A Control Office is designated for each toll circuit installed. This office 'in control' — has the responsibilty for fast restoration of service — and gives the necessary directives to all other offices on the circuit. The lines of control are clearly defined and respected by all.

High reliability depends on having qualified personnel available to oversee all service aspects and take action to restore service in case of failure. Larger toll offices, major carrier and microwave route maintenance centres are manned 24 hours a day, seven days a week. Smaller centres are manned eight hours a day and have trained craftsmen on call the rest of the time.

To manage the telephone system both in times of emergency and under normal conditions it is important to know the operational status of the network at all times. To do this each of the eight major companies which form the Trans-Canada Telephone System maintains a Status



The heart of the emergency restoration system is the Trans-Canada Status Centre. In the event of a nation-wide emergency, it becomes the Emergency Operations Centre from which senior management direct the operations and restoration of services.

Centre which reports all abnormal service conditions to its top management. Its main functions are:

—receive and assess reports on potential and actual failures.
—provide reports to management.
—liaison with other Status Centres in Canada and the U.S.A.
—assist in preparation of restoration plans.
—analyse outages.

Bell Canada's Company Status Centre also doubles as the overall Trans-Canada Status Centre.

Under the plan small groups of circuits (usually 12) are established from the Terminal Area Protection access office to a distant toll centre where they terminate at the switchboard. Only persons with an established need to use these circuits in times of disaster know the number.

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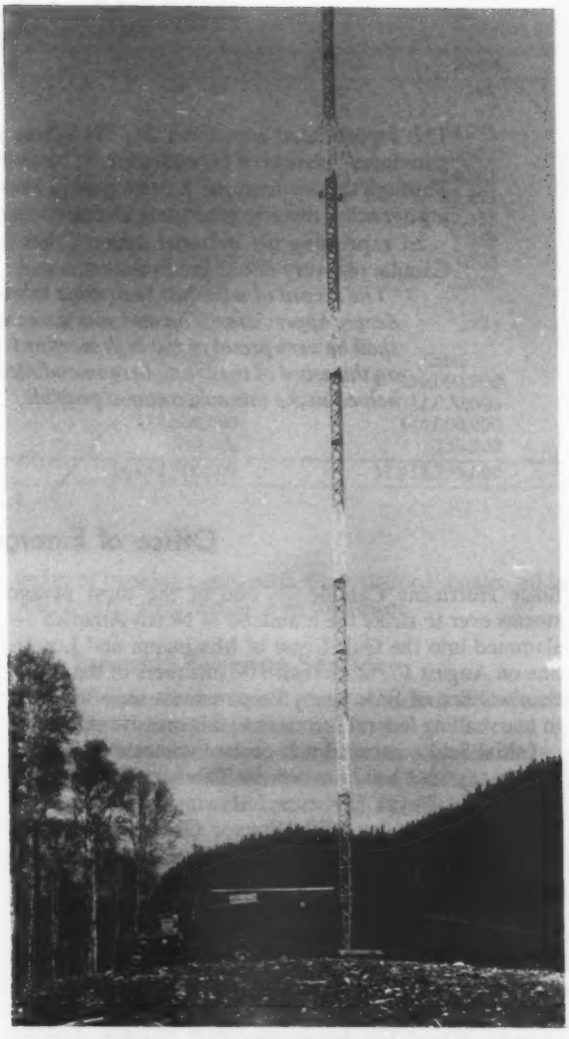
In any emergency, these Status Centres become Emergency Operations Centres from which senior management directs the operations and restoration of services. In a nationwide emergency, the Trans-Canada Status Centre becomes the System Emergency Operations Centre and co-ordinates the activities of the various companies. In addition, each telephone company has Damage Assessment Centres which in localized emergencies take over direction of restoration of the local plant facilities. In case of major widespread disaster, these local centres report to their Company Emergency Operations Centre which report to Regional Centres which in turn report to the System Emergency Operations Centre. The emergency reporting and operating procedures of the Trans-Canada companies were last tested in the fall of 1968 during exercise TRANSCAN I.

Emergency Restoration

Intercity facilities come in "big bundles". A TD2 microwave route contains as many as 12 two-way radio channels, 10 of which are assigned for service providing a total capacity of 6,000 voice circuits. The remaining two channels are reserved for automatic protection.

When trouble occurs the protection channel automatically switches in — so rapidly that there is no interruption to services and customers never know there has been a failure.

However, there are times when natural or man-caused disasters strike our communication facilities — in these cases the protection channel itself may be a casualty or the extent of the failure may be such that available protection is inadequate. Broadband Restoration has been designed to meet these situations. In many cases these re-routes will detour the original facility by hundreds of miles. Broadband restoration is controlled by Restoration Control Offices established across Canada. Restoration plans have been prepared for every broadband channel and in emergencies, these plans are implemented by the appropriate Restoration Control office.



Emergency restoration faciliites, such as the microwave tower and generating unit pictured above, allow Canada's telephone companies to maintain intertoll service for extended time periods while damaged equipment is repaired.

The ability to restore facilities rapidly doesn't just happen — constant practice is required. Dry runs are conducted on every plan at least once every three months.

Broadband restoration is designed for failures of short duration. Where permanent repairs will take weeks or months, broadband restoration is supplanted by a system called emergency restoration. Emergency restoration would be required in the event that a radio building or

(*continued on page 24*) **TELEPHONE**

HURRICANE CAMILLE–1969

Part I*

This report dated September 25, 1969, was prepared as part of the Office of Emergency Preparedness' mission of coordination in cases of declarations of major disaster by the President. Through this medium, each participating agency was informed of the actions of other participating agencies, thereby generating increased spontaneous mutual support.

In expressing his personal appreciation for the contributions of those responsible for the Camille recovery effort, the President stated:

> *"The record of what has been done is one which the entire nation greatly admires and deeply appreciates. You and your associates and all those who have helped in this effort shall be very proud of the high standard which has been achieved. I hope you will pass on this word of thanks and commendation — from me and all Americans — to all who helped make this achievement possible."*

Office of Emergency Preparedness

Since Hurricane Camille — one of the most savage storms ever to strike the mainland of North America — slammed into the Gulf Coast of Mississippi and Louisiana on August 17, more than 100 members of the President's Office of Emergency Preparedness were involved in marshalling federal response to this massive disaster.

Initial field command and control was exercised from OEP's regional headquarters in Thomasville, Georgia, and Denton, Texas. However, following detailed tours of the disaster area by OEP Director George A. Lincoln and his Deputy Fred J. Russell, a new command post was established in Gulfport, Mississippi. From this headquarters, co-located with other federal and state officials having prime responsibility for recovery operations, George E. Hastings directed federal efforts along the entire Gulf Coast. Hastings, director of OEP's Southwest region, is acknowledged to be the nation's top hurricane recovery expert. His deputy, Creath A. Tooley, director of the Northwest OEP region, supervised the massive restorative efforts in Alaska following the Good Friday earthquake of 1964.

Hastings established four satellite offices — in Biloxi, Pass Christian and Bay St. Louis, Mississippi, and New Orleans, Louisiana — to coordinate the efforts of the more than 20 federal agencies with assistance roles. In the Gulf Coast area, more than 20 OEP disaster specialists from around the nation coordinated the federal supplemental efforts and administered funds triggered by the President's major disaster declarations for Camille in Mississippi and Louisiana.

Other OEP disaster specialists under Regional Director Robert Carmody, with headquarters in Olney, Maryland, fanned out to the stricken areas of Virginia and West Virginia. They coordinated the efforts of many federal agencies providing supplemental assistance to state and local governments.

Based on data developed by or furnished to the OEP by other federal agencies and the American Red Cross, an assessment of Camille's impact on people and prosperity in the four states affected most severely is shown at Figure 1.

Department of the Treasury

Immediately after the hurricane struck, Treasury offices placed in effect emergency measures designed to help with the financial needs of storm victims and contribute to restoration of the economies of the disaster areas. The measures, patterned on previous Treasury assistance to victims of hurricanes and other disasters, included both individual actions by the Department and cooperative efforts with other federal agencies.

The Bureau of Accounts

The Bureau speeded up processing and release of monthly checks to regular recipients in the Gulf Coast area. It also established an emergency disbursing office in Gulfport to make funds available quickly to persons obtaining disaster loans from the Small Business Administration.

More than 17,000 Treasury checks scheduled for delivery in early September to retired persons, veterans and other regular recipients in the hurricane-damaged areas of Mississippi and Louisiana were released to the

*The second half of this report will be published in the next edition of the Digest (December 1969-January 1970). It will include sections dealing with health, housing, transportation, finances, power, NASA, veteran administration, Red Cross and other agencies.

Impact of Hurricane Camille on People and Property
as of approximately September 15, 1969

	Miss.	La.	Va.	W. Va.	Total
Dead	130	7	109	2	248
Missing	40	0	43	0	83
Total families suffering loss	64,154	7,737	3,763	363	75,653
Dwellings destroyed	3,880	1,768	338	36	6,022
Dwellings major damage	12,111	1,751	415	84	14,361
Dwellings, minor damage	29,684	1,883	1,870	218	33,655
Trailers destroyed	421	651	71	12	1,155
Trailers, major damage	388	266	73	6	999
Farm buildings destroyed	673	102	430	300	1,505
Farm buildings, major damage	2,214	75	526	15	2,830
Small businesses, destroyed or major damage	568	111	101	5	785
DOLLAR:	Public		Private		Total
Mississippi	$200,000,000		$ 750,000,000		$ 950,000,000
Louisiana	10,000,000		312,000,000		322,000,000
Virginia	10,000,000		130,000,000		140,000,000
West Virginia	250,000		500,000		750,000
Totals	$220,250,000		$1,192,500,000		$1,412,750,000

FIGURE I

postal service two days ahead of the normal schedule. This action facilitated delivery of checks on the regular payment dates by emergency post offices in the disaster areas.

Treasury's emergency disbursing office — a branch of its Birmingham Disbursing Centre — was established September 3 at Gulfport. Through September 15, the disbursing office had made 221 loan payments totalling $353,000. It expected to make 100 to 200 payments a day during the next few weeks.

The Bureau of the Public Debt

The Bureau instructed the Department's paying agents in the disaster areas to redeem U.S. Savings Bonds and Freedom Shares in hardship cases even if they had not been held the required 60 days and one year, respectively.

Where Savings Bonds and Freedom Shares were lost or destroyed in the Hurricane, Treasury waived the normal six-month waiting period for replacement and speeded the issuance of duplicate securities.

The Department also gave preferential handling to claims for relief because of loss, theft or destruction of other registered securities, and to requests for replacement of destroyed Treasury securities in bearer form.

The Office of the Treasurer

The Treasurer assigned priority to the settlement of claims for the loss or destruction of Government checks covering annuities, salaries, or other payments, and to claims resulting from the damage of currency. Special attention was given to claims involving hardship.

The Comptroller of the Currency

The Comptroller, as administrator of national banks, assisted in the prompt restoration of full banking services in the hurricane-damaged areas by sympathetic interpretation of banking regulations. Four national banks, all in Mississippi, were damaged by the storm.

The Internal Revenue Service

The Service took a broad range of actions to assist the hurricane victims, including:

—Wide distribution of information on the deductibility of casualty losses under federal tax laws.

—Assistance and counseling for individual taxpayers.

—Specialized assistance for residents of Mississippi who suffered losses because of the heavy destruction of timber in that state.

—Notice to certain fiscal year taxpayers that they may deduct their losses if the hurricane occurred after the end of their tax year but before the due date of their tax returns.

—A ruling that contributions to the "We Care — Hurricane Camille Relief Fund" will be tax deductible for the donors.

—Arrangements for special attention in the 1970 filing period to special claims and refunds from the disaster areas, so that refunds may be speeded.

—Advice to taxpayers who file declarations of estimated tax that they could amend their declarations on or before September 15, 1969, to reflect any decrease in estimated tax because of casualty losses.

Treasury Cooperation with Banking Agencies

The Department also worked with other federal agencies to assure the availability of bank and other credit facilities and services in the Hurricane Camille areas.

At Treasury's request, the Coordinating Committee

on Bank Regulation met on August 27 to discuss ways of providing a flow of credit to businessmen, home-owners, and students. Representatives of the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the Office of the Comptroller of the Currency, and the Federal Home Loan Bank Board exchanged information on the damage suffered by the institutions under their respective jurisdictions, reviewed the assistance each agency was giving, and discussed longer-term needs of the disaster areas. The representatives agreed on continued close cooperation to provide all possible assistance to the storm-damaged communities.

Department of Defense

Well before Hurricane Camille struck, preparations were made to insure that the Department of Defense could respond adequately and immediately in the event of a natural disaster. As soon as Camille had passed, active Army, Air Force, Navy and Marine Corps personnel were rushed into the Gulfport-Biloxi area to join with National Guard and Reserve forces to conduct rescue and relief operations.

The Department of the Army was given the responsibility of coordinating all the military services. Overall mission coordination was conducted in the Pentagon Army Operations Center.

The U.S. Continental Army Command at Fort Monroe, Virginia, coordinated the relief efforts of all the services within the disaster area. This was accomplished primarily through Emergency Operations Centers at Third Army Headquarters, Fort McPherson, Georgia, and at Fourth Army Headquarters, Fort Sam Houston, Texas. In addition, Third Army collocated a Liaison and Coordinating Detachment with the Mississippi Army National Guard Command Post at Gulfport. This detachment, headed by Major General John M. Finn, provided communications links from within the disaster area to the Office of Emergency Preparedness, the Department of the Army, and Third Army headquarters.

In terms of numbers of men committed to relief operations, the peak military effort was reached August 28 when some 8,660 active, National Guard and Reserve personnel were engaged. As additional civilian engineer and contract manpower reached the area, the military commitment was scaled down to less than 600 by September 8.

Army

The largest active Army unit sent to the disasater areas was the 43rd Engineer Battalion (Construction) from Fort Benning, Georgia, which left its home base on August 20 and worked in the devastated area until September 8. Equipped and trained to perform heavy engineering work, the men of the battalion opened some 500 miles of road and cleared more than 25,000 tons of debris in supporting recovery operations. On August 26, Company D, 818th Engineer Battalion arrived from Fort Benning. This unit remained in the area, and conducted road clearing and debris removing efforts until September 14.

Army aviators performed a wide range of missions including evacuation of families from inundated areas; removal of hospital patients from threatened sites to other facilities; and search, recovery and supply operations. During the period, almost 600 medical evacuees were moved on Army aircraft. In addition, some 2,400 other persons were transported, along with more than 300 tons of supplies and equipment.

As families were forced from their homes, the monumental task of feeding the hungry fell largely on Army food service teams. Air Force transports flew teams from Forts Bragg, Campbell, Gordon and Jackson into the disaster area on August 21. More than 125,000 hot meals were prepared and served to displaced and needy persons by Army cooks as of September 12.

Contaminated public water systems were a serious health problem. Engineer water purification teams were brought in to alleviate that problem, and Army trucks and trailers transported potable water where needed.

As recovery operations got underway and as the casualty total mounted, state officials turned to the Army for assistance in handling fatalities. Mortuary teams from Forts Benning, Bragg, Campbell and McClellan were flown into the Gulfport area on August 22 and aided local morticians until September 2.

Lending depth to rescue and recovery operations, 15 scout dogs and handlers from Fort Benning joined the effort on August 23. The canines were invaluable in locating victims trapped beneath wreckage and debris.

Other active Army support consisted primarily of providing trucks and drivers, electrical power generators, communications equipment and operators, and laundry teams.

Army National Guard units also assisted civil authorities with rescue, security and clean-up operations. Those units also provided transportation, communications and electrical power generating equipment. At Camp Shelby, the Mississippi National Guard established a refugee center capable of accommodating some 4,000 persons. In addition, the National Guard maintained martial law in three Mississippi counties as directed by the Governor on August 19. Martial law remained in effect until August 27.

On August 23, the Army Chief of Staff initiated Operation Query, setting up a center in Gulfport to obtain information about families of military personnel in the disaster area. Until the operation was terminated on September 4, 84 queries from servicemen all over the world were handled by this center.

Corps of Engineers

District Engineers of Mobile and New Orleans committed their equipment and skills to the disaster relief operations from the beginning. Teams of engineers and architects were sent into the area to conduct surveys of public buildings and to determine eligibility for federal assistance. Detailed surveys of harbors, channels and basins were also completed to determine work required before shipping and boating could be resumed safely. Close liaison was maintained with the Coast Guard to position and establish navigational aids in Biloxi Harbor. Also under the District Engineers' supervision were the massive jobs of draining the flooded areas and dike enlargement and restoration.

A three-phase recovery program estimated at $30 million is being carried out by the Corp in Mississippi and Louisiana.

1. The total value of work under Public Law 875 assigned to the Corps of Engineers by the Office of Emergency Preparedness is estimated at $15,390,000, of which over $12 million is in Mississippi and more than $2,900,000 in Louisiana.
2. Public Law 99 work being carried out under the Corps' statutory authorities total $6,186,000, of which Louisiana jobs are valued in the neighborhood of $3,900,000 and Mississippi work at $2,300,000.
3. Operation and maintenance work consisting of dredging, clearing channel obstructions, reconstruction of jetties and restoration of navigation aids is estimated at $8,400,000 for the two states. O&M jobs in Louisiana are estimated at $5 million and Mississippi work is valued at $3,400,000.

Corps of Engineers contractors in Louisiana have removed 43,480 tons of debris since recovery operations began.

Contractors working for the Corps in Mississippi moved 73,282 tons bringing the Phase II clearing and removal operations in Mississippi to 73 per cent of completion. Thirty-two contracts have been awarded by the New Orleans District. Corps personnel engaged in Camille recovery operations in the New Orleans District total about 240. Mobile District employees number about 390.

Office of Civil Defense

Civil Defense communications systems (including the NationalWarning System and National Communication System), as well as commercial radio and television, provided storm warnings prior to the hurricane's onslaught. When the extent of damages in Mississippi became apparent, the Louisiana Civil Defense Agency dispatched to Mississippi some 170 ham radio operators with self-sustaining generators and equipment to aid in emergency communications.

Plaquemines Parish ordered exacuation of most of its land areas late Saturday, August 16. At this time the State Civil Defense headquarters went into 24-hour operation. This center included personnel from State Police and public safety units in adjacent parishes and communities along the coast. Civil Defense Emergency Operation Centers (EOC's) were activated, with shelters opened and prepared for operation as far inland as Natchitoches, 250 miles northwest of New Orleans.

Immediate public response to the possible needs of the Camille victims in Mississippi, Louisiana and Virginia was overwhelming. Public officials took immediate steps to send massive aid to the affected areas. As a result, most of the civil defense directors in the disaster areas were swamped with volunteers, food, clothing, equipment, medical supplies, medical personnel and other technicians. A number of civil defense directors established reception and staging areas for receiving and dispatching this aid.

Emergency civil defense organizations and procedures were activated in advance of Camille, since it was anticipated that the hurricane would virtually eliminate local government in the most severely hit areas.

Air Force

The focal point of Air Force assistance was Keesler Air Force Base at Biloxi. Even before the storm had passed, Air Force personnel went into communities adjacent to the base, surveying damage and performing rescue operations.

Air National Guard and Reserve men and aircraft joined active duty personnel in evacuating families from flooded and threatened areas, and in bringing in recovery equipment, personnel and supplies. Some 800 relief personnel and 500 tons of equipment and supplies were brought into the area during the critical first 48 hours. Crews from throughout the country joined in the effort, coming from as far as California, Illinois and Maryland.

Evacuation of over 700 patients from Veterans Administration hospitals in the affected area to other facilities was accomplished by the 375th Air Medical Evacuation Squadron from Scott Air Force Base, Illinois. From Gulfport, 600 patients were flown to VA hospitals in Tuscaloosa and Tuskegee, Alabama, and Augusta, Georgia. Another 150 were carried from Biloxi to Miami and Gainsville, Florida; Charleston, South Carolina; and Salisbury, North Carolina.

One Air Force Reserve crew, flying a C-119 transport, brought 16,000 tetanus immunization kits and some badly needed X-ray units to Gulfport on August 22. Other services and equipment provided by the Air Force included refrigeration vans, electrical generators, trucks and sedans, helicopters and fixed-wing aircraft, and airspace control teams. The Keesler Air Force Base MARS station was also tied into the disaster control network and provided long-range communications.

The peak number of Air Force personnel committed

to relief operations on a single day was 4,344 on September 1. By the 9th, the situation permitted the Air Force to withdraw resources committed solely to the disaster area, but support continues on an individual, mission-request basis.

Navy and Marine Corps

Before Camille hit, Navy disaster relief preparations began with establishment of a command communications center in Gulfport on August 16. Initial relief operations were undertaken by three Mobile Construction Battalions (SeaBee), the station complement of the Pensacola Naval Air Station, and the 8th Naval District Headquarters at New Orleans.

About 70 Marines from the SeaBee Center also were sent into the area with several trucks and amphibious tractors. About 500 persons who took refuge in a warehouse were relocated to a safe area by the Marines when the warehouse collapsed. Marines continued to evacuate stranded persons to sheltered areas, conduct search and recovery operations, and set up and staff medical aid stations as required.

The three Navy construction battalions were initially assigned road-clearing duty. One battalion went to Long Beach, another to Pass Christian, and the other to Gulfport. The battalions cleared more than 200 miles of roads, assisted in restoring electricity and water service, and provided stretcher bearers and other services.

Other Navy support consisted of providing electrical power for a radio station, nursing home, food storage sites, and water purification and pumping plants.

Navy amphibious vehicles were used in search operations, and for transporting injured and displaced persons to the base for treatment, care and housing. In addition, the Navy provided accommodations and meals for highway department workers and electrical linemen. The USS Bushnell, a submarine tender enroute from New Orleans to Key West, answered a call from the Town of Pilottown and furnished urgently needed supplies and medical aid.

All Navy elements reverted to normal duty status operations on September 8; however, assistance will continue to be provided as required on a case basis.

Department of Justice

Federal Bureau of Investigation

A special bureau identification team from Washington, D.C. assisted the coroner of Harrison County, Mississippi in the processing of 30 unidentified victims. In addition, Special Agents in Gulfport handled 62 requests for assistance in locating possible victims.

Immigration and Naturalization Service

Two border patrol inspectors based in Gulfport participated in search and rescue operation and escorted supply convoys in the immediate aftermath of Camille. They later provided transportation for federal, state and local officials engaged in relief operations. They were supported by a patrol inspector in New Orleans who shuttled to them gas, water and other supplies necessary for them to remain in operation.

U.S. Marshals Office

The Marshal for Gulfport and three of his deputies found quarters for and safeguarded the families of two U.S. judges whose homes were destroyed in Gulfport and Bay St. Louis. This was done while the judges were hearing school desegregation cases in Jackson.

While salvaging court records and books from the U.S. District Court in Gulfport, the Marshal also searched for and located relatives of Senator Eastland.

Post Office Department

Trailers, from which temporary operations were conducted, were positioned near the destroyed structures. Services in both communities, as well as areas from Alabama into Louisiana, were restored by September 2.

Damages and the emergency steps taken to maintain services are estimated to have cost between $100,000 to $150,000.

Department of the Interior

U.S. Geological Survey

Geological Survey crews were dispatched on gas and oil industry damage assessment missions as soon as Camille had passed. At present, Survey oil and gas supervisors are permitting companies which lost tanks, oil wells or other equipment to make temporary arrangements for continued production. These include relocating offshore structures until destroyed facilities are rebuilt.

Survey hydrologists are preparing a hydrographic atlas depicting the flooding caused by Hurricane Camille in Mississippi. They have found that tidal flooding ex-

ceeded 21 feet above mean sea-level in some places. That is six feet above the previous record high, measured in September of 1947. A portion of the atlas will locate artesian wells which could serve as emergency water supplies in the absence of power for pumping.

Bureau of Commercial Fisheries

Bureau experts reported extensive damages to fishing facilities and probable severe destruction of oyster reefs as a result of Camille. The estimated capital investment loss to the fishing industry along the Gulf Coast was about $5 million; repair or replacement costs are expected to exceed $8 million. However, all operators, with the exception of one, intend to rebuild their plants.

Inventory losses of canned shrimp and oysters may exceed $2 million if salvage operations involving some 200,000 cases prove unsuccessful. The Food and Drug Administration of the Department of Health, Education and Welfare will determine the operation's success after a suitable period for incubation of possible organisms.

Damage to commercial fishing vessels was minimal, according to Bureau surveyors. Only seven vessels were beached, and these received only minor damage. However, an unknown number of small skiffs probably are destroyed, but an accurate count has not been obtained.

To assist the commercial fishing industry in its recovery, the Bureau is coordinating Inventory Loss Prevention Loans from the Small Business Administration. The Navy, at the request of the Bureau, has refloated several of the stranded vessels.

"Operation Grubstake," a program to return hard-hit fishermen to operation, is being sponsored by the American Red Cross, the Standard Oil Marketing Division, and the Pascagoula Ice and Freezing Company. Grubstake is providing vessels of affected operators with fuel, oil, ice and food needed to resume fishing operations.

Economic loss was enormous to communities primarily dependent on income from the commercial fisheries. The Bureau concludes that the total impact probably will never be accurately determined because of unknown factors related to the expected income loss from oyster production, the value of lost processed products for 1969 and 1970, and the temporary loss of employment affecting the community's payrolls.

Federal Water Pollution Control Administration

The FWPCA dispatched a mobile laboratory and operators to the Gulf Coast as the storm forged into Mississippi. FWPCA personnel were also requested to operate a packaged sewage treatment plant, to locate debris disposal sites, to locate disinfectants to be used for sewage bypassed around inoperable treatment plants and to prescribe pesticides for pest control which are least harmful to human and acquatic life.

The FWPCA was faced with oil pollution problems in the Lower Mississippi River, where some 2,000 barrels of crude oil were lost from a tank farm and covering levees from Boothville to Venice. At their advice, vacuum equipment and straw was used to clean up the oil.

The Middle Atlantic Region of the FWPCA was alerted to the emergency condition in Virginia's Tye River, possibly carrying pesticides and herbicides from a plant at Massies Mill, Virginia, struck by a flash flood.

Also in Virginia, survey teams reported that water and sewer systems at Lexington, Buena Vista and Glasgow had received heavy damages. Water systems were restored to service and the sewage treatment plants at Lexington and Glasgow are being repaired.

Department of Agriculture

Insect infestations were a major threat along the Gulf Coast. USDA deployed over 60 men, using 10 jeep mounted insecticide sprayers and many items of individual equipment to kill flies, mosquitoes and other pests. At last count, 114 drums of malathion were used to kill insect larvae and pupae. During the peak treatment period, seven Air Force planes were spraying insects in the storm area. USDA spread 100,000 pounds of donated poison bait to control fire ants infesting over 75,000 acres.

Consumer and Marketing Service

To date, an estimated 4,687,000 pounds of surplus Department food has been used by victims of Hurricane Camille. As many as 30 USDA nutrition specialists had been working at one time with local authorities in feeding storm victims.

Forest Service

USFS personnel are working with state officials and private industry along the Gulf Coast to help salvage as much as 1½ billion board feet of severely damaged timber and control proliferation of timber destroying insects. The 501,000 acre DeSoto National Forest near Biloxi, Mississippi was the hardest-hit national forestland with 6,000 acres containing 90 million board feet of badly damaged timber. A total of 3,000 acres will have to be cleared and planted or seeded. At the Waynesboro, Virginia George Washington National Forest a heavy loss of life among a large population of campers probably was avoided by middle-of-the-night warning patrols by Forest Service personnel.

Rural Electrification Administration

REA made $2.3 million in emergency loan funds immediately available to four cooperative rural electric systems to speed temporary power to their service areas blacked out by the storm. Another $6.3 million in REA loans has been approved to enable three of those cooperatives to install permanent lines and equipment to replace those destroyed by Camille.

Farmers Home Administration

Recent estimates indicate that more than $8 million in disaster loans will be needed in four states to restore rural homes and farms damaged by Camille. Mississippi will require at least $7 million in emergency farm credit, with an additional $650,000 needed in Virginia, $500,000 in Louisiana, and $100,000 in West Virginia. So far, the Administration has accepted about 150 applications for emergency loans from throughout the hard-hit areas. Almost all are applications for housing loans at three percent. To date, 10 housing loans amounting to $109,720, and five farm emergency operating loans at three percent have been made. The agency probably will receive well over 200 more loan applications from the Gulf Coast area alone. Residents of 33 Mississippi counties, 25 Virginia counties, four Louisiana parishes, and one West Virginia county have been designated as eligible for these loans by the Secretary of Agriculture.

Agricultural Stabilization and Conservation Service

The Service has extended emergency grazing privileges on reserve cropland taken out of production in 15 Mississippi counties and 12 counties in Virginia and made 29 car-loads of emergency feed available from warehouses. Emergency funds for cost-sharing payments allocated by ASCS State Committees for farmland clean-up, fence building, and conservation structure restoration totaled $300,000 in Mississippi and $750.000 in Virginia.

Soil Conservation Service

Affected landowners have been assisted by SCS personnel on disaster relief projects. Salaries for this effort total $195,000 to date. Thirty Service employees are working full time with the Governor's Forest Disaster Salvage Council to aid landowners in a 19-county area in Mississippi in salvaging timber and in replanting ravaged areas. SCS employees have interviewed over a thousand Mississippi landowners on timber damages and possible harvests to get information for state forestry officials and advise landowners. Existing small watershed project structures in Virginia are credited with helping save lives of numerous campers and hold down flood damage costs.

Department of Commerce

Business and Defense Services Administration

Through a survey of Department field offices in Louisiana, Mississippi, West Virginia and Virginia, BDSA determined that no contractor with defense rated contracts needed priority assistance to resume production. Had that been needed, the Administration would have issued on-the-spot priorities.

Economic Development Administration

As a result of surveys of the Mississippi Gulf Coast by an EDA team, the affected counties of Harrison, Hancock, Pearl River and Stone have been designated for EDA assistance under the "sudden rise in unemployment" provision of the EDA Act. Those counties also have been added to the Southern Mississippi Economic Development District. The Administration's Economic Development Specialist in Mississippi is working with representatives of the OEP and six affected municipalities to assist in expanding utility systems now being restored.

Another EDA team met with Mississippi mayors and other local officials to identify priorities, estimate replacement costs, and determine pre-existing inadequate facilities which could be improved during restoration.

After field surveys of the affected areas in Alabama, Virginia and West Virginia, Administration officials determined that EDA assistance was not needed in those states as a result of Camille.

Maritime Administration

A technical expert on port matters was dispatched to the Gulf Coast to consult with local, state and other federal officials on problems of navigation, port and pier structures, and waterways in the aftermath of the hurricane.

The Administration's New Orleans office released for distribution to devastated areas of Mississippi and Louisiana the following excess items: 3,000 blankets, 8,000 pillowcases, 25,000 sheets, 15,000 hand towels and 30,000 bath towels.

The Administration's assistant director of ship operations in the Gulf Coast, accompanied by representatives of the Navy and the Murphy Pacific Marine Salvage Company, surveyed the SS Alamo Victory, forced aground at Gulfport. The survey concerned aspects of refloating the vessel, discharge of cargo, the feasibility of continued manning of the vessel, and to determine injuries. Two representatives of the agency's legal staff also visited Gulfport to determine liability.

(continued on page 23) **HURRICANE**

NETHERLANDS CIVIL DEFENCE*

by

H. G. Franks

When the Prime Minister of the Netherlands, Mr. P. J. S. de Jong, opened the Provincial Emergency Council Post for Brabant at the end of May he was pinpointing the success of a plan by which each of the eleven provinces of the Netherlands has been supplied with a civil defence headquarters. For the post he opened at 's-Hertogenbosch was the last of the chain designed to ensure that every province should have a coordinating centre for civil defence or, as the Dutch put it, complete protection of the people and their interests.

Although implemented with remarkable little fuss or noise, civil defence has been in operation in the Netherlands since 1957, even if at times there has been fluctuating activities and official interest. Outwardly during the past few years public interest has waned, mainly because most of the people were so confused with the prospects of nuclear warfare and the conflicting statements about the impossibility of being able to do anything really effective about countering atomic weapons that there was a desire to put the problem aside. This was not so much indifference as a desire to shelve it while more actual problems were tackled which gave promise of being solved.

However, the Netherlands Government was far from inactive, with occasional spurts as each new Cabinet Minister in charge of this subject felt it merited revived attention. So while there has not been much activity in drawing public support, a very comprehensive organization has gradually grown up which covers every conceivable facet of Dutch life. Therefore at the present time, far-reaching and deep-seated plans have been drawn up which will be presented to the people on an ever-growing scale during the course of 1969, with the accent mainly on reaching civic and political leaders as well as district and local administrations. Late in 1968 the first step in this direction was taken with the circulation, on a limited scale of some thousands, of a 132-page brochure outlining the administrative side of the civil defence preparations insofar as they appeared in the Government's Budget and the policies of all the Ministries concerned.

This was followed in May of this year by the circulation of about 110,000 copies (in the first instance) of a new booklet which summarizes what was said in the first brochure but also gives further details about what is expected of officials and non-officials who bear any responsibility at all for carrying out civil defence plans. This booklet is going to members of parliament, municipal councillors, schools and colleges, women's organizations, large factories and businesses and other groups which are expected to be called on in case of emergency.

This shows a new approach on the part of the Government which, about two years ago, seemed rather hesitant to bring the demands of civil defence to public notice. It is still recognized, of course, that there is always the danger of creating alarm if a civil defence plan is suddenly launched or presented to the population. So as a prelude to the present campaign, a general atmosphere of calm was introduced. The use of the press, radio and TV was carried out in a simple way which was factual but not too realistic; and in this connection the handling of the press before and during and after a large-scale civil defence exercise in the western part of the country was of such a character that it was dealt with non-spectacularly but at the same time treated as an important item of news.

In much the same way the local authorities are being brought into the scheme in a quiet manner by seeking their cooperation rather than issuing orders as to what they must do to comply with the law in this respect.

The Chief of Staff of the Civil Defence, General E. R. d'Engelbronner, has regular meetings with groups of Burgomasters to explain what should be done and to discuss with them how these requirements can be carried out within the limits of the capacities of the various Municipalities.

Basic Ideas

In harmony with their worldwide reputation for being realists, the Dutch are not promising complete protection for the population. In this connection they face two facts: first, that comparatively little can be done in a small country like Holland to protect 12,700,000 people from nuclear missiles; and secondly, that much can be done to make things as easy as possible for a war in which mainly conventional weapons and methods are used. Naturally, therefore, the accent is on the second fact, although the national scheme makes provision for limited protection for essential services or departments while also doing the best to minimize the effect of fall-out on the citizens at large.

Now when it comes to designing and implementing a Dutch civil defence scheme, the question of deep shelters means that no more than about 70,000 people could be protected in that way, and even then that such a protection must be a longterm and very costly plan. Meanwhile, existing facilities or possibilities are being prepared or listed, such as the Rotterdam Metro. On the whole, however, large-scale protection against the blast of atomic bombs cannot be a reality in the Netherlands.

This in turn means that it is not much use planning extensive evacuation, except perhaps from heavily industrialized areas and around airfields as a last resort. So

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wholesale mobilization of cars and other motor vehicles will presumably not be necessary, unless in special cases when required for emergency transport of things like food or relief supplies.

Because of these unassailable facts, special attention has been paid to perfecting the system of air alarms. The wartime chain of sirens has not only been kept in good shape but has been considerably expanded. At noon on the first Monday of every month all the sirens are tried out, sometimes with an accompanying theoretical test of the next steps that should follow by the local administrations. Everyone knows just what these sirens mean, and the monthly try-out is a good psychological reminder to the public that the danger is always present even though not particularly likely.

It is always good, of course, to keep the message of the sirens as simple as possible by not having too many different signals. At the moment the Dutch system consists of only two: the series of short wails as a warning, and the long unbroken wail to mark the all-clear. Nevertheless, it would seem a good idea for the Dutch authorities to consider the Norwegian system of a third signal in the form of three prolonged series of continuous blasts as a call to the people to switch on their radios for an important message or instructions. As information at a critical moment can be of vital importance, no possible quick and easy way of reaching the bulk of the population should be neglected.

A very useful sector of the Dutch civil defence system is the existence of a mobile column manned by reservists or men called up for compulsory military service for whom there is no present room. These men are well-trained and readily available, although in time of war the force would probably be considerably expanded from the existing nucleus.

Voluntary Staffs

Apart from the administrative and organizing staff, the present Dutch civil defence corps has a large number of volunteers. Moreover, it is well up in strength, as shown by the following figures:

Sector	No. Required	No. Enrolled
Commando	8,600	7,100
Self-protection teams	70,000	35,000
Fire-fighters	29,900	23,000
Rescue service	16,600	15,900
Health service	14,900	13,500
Nuclear fall-out service	11,300	10,700
Communications service	5,000	4,000
Mobile columns	21,700	21,700

The only sector in which recruitment has been slow is that of the first aid squads for local service, for which so far only about 2,100 have enrolled out of a total requirement of 15,500. However, this sector was only formed a short time ago, and in any case it would certainly increase to full complement were its services really needed.

Other important activities of the civil service organization include the emergency beds scheme in which about 20,000 beds are stored in 30 warehouses in 15 different locations around the country; rationing cards with food stores in many places; emergency fuel and energy supplies organized; emergency hospital arrangements; and water supply plans.

A glance through the long list of civil defence responsibilities accepted by the different authorities gives a few surprises as well. For example, the provisions include the protection of art masterpieces, public documents, and other moveable treasures by moving them to four prepared hiding-places; protection for historic buildings, museums and libraries; and care even for historic baptism fonts, pulpits and graves in village churches. Many microfilms are also being made of thousands of buildings and single items.

Elaborate Organization

Although at first sight the Dutch civil defence organization looks almost too complicated to work, a little study shows that it should be very practical in operation because it is based largely on the existing national, provincial and local administrative systems.

Constitutionally it comes under the Ministry of General Affairs controlled by the Prime Minister. Operationally it is run by General E. R. d'Engelbronner, Chief of Staff Civil Defence, who is in actuality the coordinator of all the activities in this field run by the various other Ministries.

Altogether civil defence in one form or another figures in the Budgets of no fewer than 12 different governmental departments, each headed by a Minister. It is obvious that this varied pattern of responsibilities requires careful coordination to ensure that there is no wasteful overlapping of activities and that no important items are missed out through lack of consultation.

Yet even now the total expenditure by all these Ministries on civil defence is less than one-eighth per cent of the total national income and under one-half per cent of the total Government Budget.

At the moment, however, this important subject is receiving more attention, and the expenditure is fixed on a plan running from 1968 to 1971. For the service year 1969 the total civil defence budget works out to about Fl. 100 million, while the whole four-year plan is budgetted to cost about Fl. 446 million. The current year's expenses and the balance of 33.5% of investments.

A good indication of the thoroughness of the all-round civil defence plan in the Netherlands can be seen from the following breakdown of the 1969 expenditure on it by the various Ministries:

General Affairs	Fl.	1,177,500
Home Affairs		48,978,000
Education and Science		51,000
Finance		600,000
Defence		13,140,000
Housing and Physical Planning		1,100,000
Transport and Waterways		19,347,000
Economic Affairs		2,734,000
Agriculture and Fisheries		3,836,000
Social Affairs and Public Health		8,336,000
Recreation, Culture and Social Work		700,100

These proportions of spending will remain much the same in the years up to 1971, although inter-departmental variations will occur according to whether the need in any particular year will be for increased telecommunications, food supplies, mobile columns or public information.

Legal Foundation

Another feature of the Dutch civil defence organization is that it does not need any special legislation to keep it going or to expand it when necessary. There are, in fact, 41 Acts on the Statute Book which in one way or another cover civil defence, some going back as far as 1851 and 1875, and covering everything from the appropriation of property for the public good to the control of prices and from soil production to directed labour.

It has sometimes been asked in the Netherlands whether there would ever be compulsory civil defence service in certain circumstances. The official reply is that the Government has ample powers to order this under several laws, including one which permits labour to be sent wherever needed. In case of war, too, young men in compulsory military service could be switched to civil defence activities if required.

However, even in the present time of European peace the Dutch are participating so well in the civil defence plan that it hardly seems likely that any further powers will be used or needed.

There is, perhaps, one field in which a little extra pressure might be exerted in the fairly near future: namely, industry. Although about 110,000 workers in Dutch industry have been trained for various forms of civil defence, the response of industrial concerns to the need for more intensive plans in this sector has been rather slow in the past few years. Under law all employers have a responsibility to make plans to protect their workers, and also to carry out certain provisions asked for by the civil defence authorities. A comprehensive manual has been distributed among them by the authorities, but the practical response is surprisingly slow. Many of the firms have, of course, made elaborate plans which would enable them to switch production to other things in case of emergency, but there is still much to be done in the industrial field to promote the safety of workers by the provision of special building protection, training and the formation of civil defence teams.

This problem is to be tackled by the civil defence authorities in the near future. Good success is expected, because the present slowness in taking adequate steps inside the factories is not due to indifference or to laxness but to the preoccupation of employers with other problems. Once the importance of the civil defence provisions is driven home, there is certain to be a hearty response.

All this boils down to one thing: that with a well-organized and well-planned system of civil defence in existence, the main task of the organizers now is to spread around factual information of what can be done and what cannot be done in case of emergency. There is nothing spectacular in Holland's plans; even the arithmetic of the system is not exciting. But the care and thoroughness with which the whole scheme has been drawn up, coupled with the certainty that it will operate through an administration already well suited to Dutch conditions and character, gives every ground for believing that it will stand up to any test should the unfortunate day come when it will have to be put into action.

Civil defence is nothing less than combined action for everyone's protection. It becomes a national necessity and duty in time of war, so that it is a civil privilege and duty in time of peace to ensure that the country is not caught asleep. ▲

WOMEN SUPPORT C.D.

The international service club of executive professional and business women, Quota International, Incorporated, at its 48th annual convention in Washington, D.C., July, 1969, reaffirmed its resolution concerning civil defence.

The resolution confirmed by the 12,000 member organization states:

"Whereas, Recent development of community and individual resourcefulness in the basic principles of self-protection and survival, and

Whereas, The national civil defense program in those of our nations wherein it exists provides for the training within the community along lines of defense and relief in cases of natural as well as national disaster, and

Whereas, Quota International, Incorporated has, as one of its primary objectives, a desire to be of service to each community in which a local club exists, therefore

Resolved, That Quota International, Incorporated endorses the civil defense program, making public recognition of its importance to national welfare as provided by each country of Quota membership, and further

Resolved, That Quota International, Incorporated urges its member clubs to lend their support to local civil defense organizations through study or active participation in such services or programs deemed most suitable or urgent for the community or club involved, and further

Resolved, That a copy of this Resolution be furnished to the national headquarters of the civil defense organization in each nation where it applies. ▲

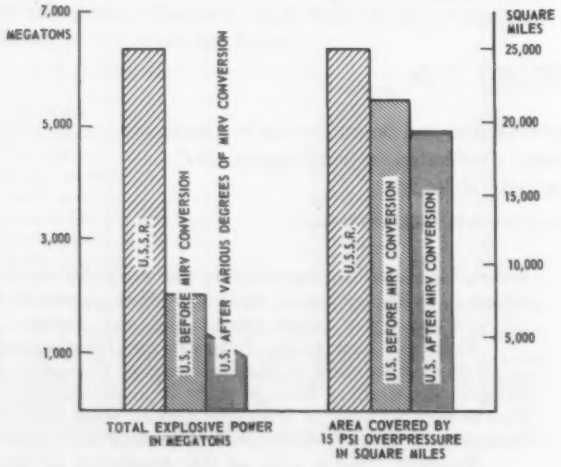
DEFENSE vs. RETALIATION

Eugene P. Wigner's address before the American Physical Society

Dr. Wigner is a frequent contributor to SURVIVE and a member of its editorial board. Here, in a condensation of his recent address before the American Physical Society in Washington, D.C., he compares plans for America's defense against plans for "revenge" in the light of odds for peace.

When preparing for the present session I was acutely aware of the great difference between tonight's discussion and earlier discussions of our Society in which I participated. Little responsibility was involved when I argued for one physical theory as against another. The great responsibility for whatever I shall say this evening weighs heavily on my mind. It is not pleasant to recall the considerations which brought me to the stand I am adopting tonight; it would be unwise to forget them.

It is good, however, first to establish certain facts. The first fact is that the missile strength of the USSR, which has been growing fast in the last two and a half years, is now exceeding that of the Unted States. This is well known to many in the Defense Department. You see, before we were forced to subdivide our warheads, we had 40 per cent of the USSR strength (Figure No. 1). When the conversion to multiple independent reentry vehicles (MIRV) is completed, our explosive power will be around 20 per cent of the USSR explosive power. Since the USSR has mainly large warheads, the comparison is less extreme from the point of view of area coverage. The area covered with a certain overpressure is proportional to the ⅔ power of the size of explosion. Two 5 MT explosions cover a wider area with a certain overpressure than one 10 MT explosion. In fact, two 3½ MT explosions have the same coverage as one 10 MT explosion. Hence, the advantage of the USSR in area coverage is smaller than in total explosive power, and it will increase to a lesser extent when we convert to multiple warheads than their advantage in total explosive power will increase. The total explosive power is, of course, a measure of the radioactivity and fallout that the weapons create; the area coverage is a measure of the instant destruction. Nevertheless, even in the latter category, the USSR's missile strength is higher than ours by almost 20 per cent before our conversion, and will be higher by 30 per cent after we succeed with our conversion program.

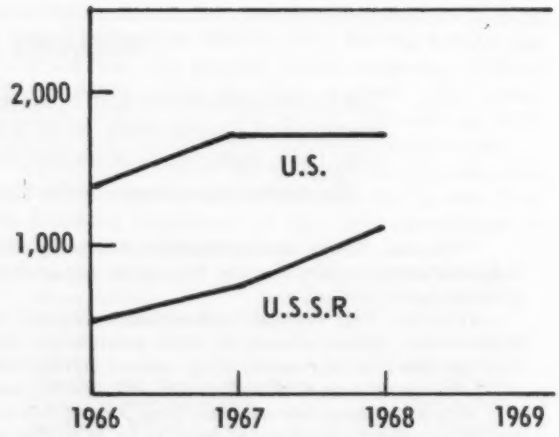


Comparison Between U.S.S.R. and U.S. of Total Nuclear Explosive Power and 15 PSI Area Coverage. (1969 Statistics)
Figure 1.

Figure 2 shows the growth of the number of U.S. and of USSR missile launchers. These numbers are probably the most easy to ascertain: the launchers are visible from above.

On the other hand, one should not forget that the size of the launchers can be very different. The launchers of the USSR can loft, as a rule, much larger missiles than can ours. What the figure shows is that, in the last 2½ years, we have hardly increased our missile strength. Our effective strength both with regard to total explosive power and area coverage is now decreasing. The USSR has increased its capability during the same period greatly, by a factor of 2½, and is now ahead of us in both these regards. In a way, I am glad that we did virtually nothing in the past 2½ years — had we increased our strength, many people would say that the USSR only responded to our provocation. As matters stand, the reason for the USSR buildup is not discussed.

You will ask me how my data can be reconciled with the statements of our earlier Defense Secretaries,



Numbers of Missile Launchers, U.S.S.R. and U.S.
Figure 2.

McNamara and Clifford. They gave the impression that our nuclear strength exceeds that of the USSR by a factor of about 4. However, if you read their statements, they say explicitly that they compared numbers of warheads. In this regard, we are really ahead of the USSR. We still are, although the British Institute for Strategic Studies estimates that they (the USSR) will catch up with us by midyear.

It is important, however, to discuss the significance of the three measures: number of warheads, total explosive power, area coverage.

I shall begin with the significance of the number of warheads. This may be decisive for a first strike which should abolish the opponent's retaliatory power. High accuracy has to go hand-in-hand with it, particularly if the missile sites to be destroyed are hardened—as are both the U.S. and the USSR targets. However, the U.S. certainly does not plan such a first strike, and the number of warheads we possess is, therefore, not a measure of our military strength.

How about total explosive power? We have about 25 per cent of that of the USSR. I must hope, therefore, that this is not of decisive importance either. I would have more justification for this hope, if we had at least adequate fallout shelters for everyone, but fallout shelters are opposed just as much, or even more, than is ballistic missile defense. It may not be news to many of you that I would, in fact, prefer civil defense to ballistic missile defense if I had to choose only one, but until recently the Defense Department has been even more concerned about opposition to civil defense than about opposition to ABM. However, as the preceding discussion indicates, at least fallout shelters are a necessity if we do not want the total deliverable explosive power, of which the USSR has 4 or 5 times more than we do, to have decisive importance.

As for area coverage, this might become the decisive factor if we have at least fallout shelters. In area coverage we are only 20 to 30 per cent behind the USSR and this would be to some degree reassuring if the civil defense of the USSR were not much superior to ours. However, before turning to this subject, I should make one further remark. Some will consider the comparison of the U.S. and USSR strengths irrelevent because, they say, both parties have so much overkill that the relative strengths matter little. They say that, even if it were true that the USSR can kill all of us eight times whereas we can kill all of them only three times, this would have little significance. Fortunately, or unfortunately, this argument is not valid. The defensive measures which the USSR has instituted, and is in the course of instituting, have so drastically reduced the fatalities which we can inflict on their people that it is ridiculous by now to speak about an overkill on our part. This is what I shall discuss next. Since we are, in this regard, far behind the USSR, the increase in the effectiveness of defensive measures should perhaps not please me. It does, nevertheless, because the increased power and effectiveness of the defense—if it extends to the U.S. as well as to the USSR—promises a more relaxed international atmosphere and all of us are surely in need of that.

The Rising Power of Defense

That even a missile defense which the opponents of our defense consider very primitive, that even such a defense can be very effective was demonstrated somewhat unintentionally by Secretary Nitze. I am referring to a non-provocative missile defense—that of the USSR. According to an example given in the Congressional testimony of Secretary Nitze, it may prompt us to replace the 10 MT warhead by 10 warheads of 50 KT each. This is a reduction of the total explosive power by a factor 20, of the area coverage to 29 per cent of its earlier value. I have been told that the multiple warheads have not yet been installed—partly for technical reasons, conceivably also for other reasons. The fact that our contemplated response to the very primitive ABM of the USSR involves such a reduction in the effectiveness of one of our weapons certainly proves that the mere existence of some ballistic missile defense can provide a high degree of reduction of the damage that the opponent can inflict. One can say, in fact, that the ABM deployment by the USSR has resulted in the most significant limitation of effective armaments that has been achieved so far.

The reduction of our total power by the Russian ABM was not very great because the changes contemplated for the other missiles are less significant than those for the 10MT warheads. 'This is because the other missiles were to carry much smaller warheads to begin with. However, most missiles of the USSR have very large warheads and if these were to be modified in the way Secretary Nitze said the 10 MT warheads are modified the gain would be, indeed, enormous.

The greatest progress that the Soviet Union has made toward defense does not lie, however, in the area of antiballistic missiles. It lies in its renewed emphasis and energetic progress toward civil defense.

My assessment of civil defense in the USSR is based on a rather thorough study of the Soviet literature on the subject, undertaken by Mrs. (Joanne) Levey of Oak Ridge National Laboratory and myself. The Russian literature seems quite open and frank, telling about the shortcomings of the arrangements as well as about their accomplishments. It leaves no doubt in the mind of the reader what the objectives are. Even if these are not yet fully accomplished — and quite likely they are not as yet — there is no question that they can be reached and that there can be no opposition to them in the USSR.

Most of the decrease in the number of casualties which we can inflict on the people of the USSR is due to their civil defense arrangements.

To avoid misunderstandings, I quite agree with Kosygin and do not consider the defense of the people to be objectionable or, as it is often put when our own defense measures are considered, provocative.

What I find frightening is their very elaborate plans for

the evacuation of their cities. These go into the minutest details. When, in the course of a study (the so-called Little Harbor Study) evacuation of the cities was considered as a possible defense measure, all members objected on the basis that evacuation can be effective only if it is ordered well ahead of the inception of the hostilities. We felt, therefore, that it is useful only as an aggressive move, as an introduction to the initiation of a crisis, or of an attack. Even though, I believe, all the participants in the Little Harbor Study were, or became in the course of the study, supporters of an expanded civil defense effort, they all felt that the planning of evacuation is not a proper means toward this, just because it is useful only to the initiator of the conflict. Evacuation is, however, the measure which is now at the center of the Soviet program. It may be, one day, terribly effective. It is true that the evacuation cannot be carried out in secrecy; it is equally true that we could do nothing even if we knew that it was being carried out.

How much would the evacuation of the major cities of the USSR reduce the fatalities in a thermonuclear exchange? We have made tolerably accurate calculations on this; let me give only a crude picture. Moscow and its surroundings have a population of about 6½ million. If these are spread over a circle of 50 mile radius, the density of people would become about 850 per square mile. With the area coverage of our missiles (as given in Figure No. 1) I showed we could cover the territory occupied by about 9½ million people with a blast wave of 15 psi overpressure. This assumes the usual attrition rate of ⅓ and that we use all our missiles, without exception, for this purpose — an unlikely assumption indeed. The midlethal pressure, from lung damage, is much higher than 15 psi, but considering everything 15 psi is a reasonable value. It disregards any damage which a first strike may inflict on our retaliatory force and also the sheltering which their subways provide.

Hence, actual fatalities would be a good deal below the 9½ million I quoted. Certainly, under no likely circumstances of a conflict can one reasonably speak about overkill on our part.

Conclusions

It is not pleasant to have to admit the weakness of our defenses. It is even less pleasant to admit that we are slower than necessary in affording a proper role to the protection of our people and their values and continue to rely solely on retaliation — that is, the threat of revenge. I feel, however, that in this last regard the blame falls heavily on the intellectual community, part of which has a spontaneous revulsion against all innovations in the defense structure, be these for the better or the worse.

I myself consider the possibility of strengthening the true defense, that is the possibility to protect our people and our installations, one of the most favorable developments that have taken place in the last twenty years. The possibility of mutual annihilation appears to me a most unhappy state of affairs. The U.S. will not start a conflict and, if an enemy destroys our country, what good does it do us to take revenge and destroy his? At the very best, retaliation makes sense only as a threat to deter enemy attack. But it is not even a very plausible threat because the enemy knows it would be purposeless to carry it out. The damage that the mutual ability to destroy the other does to mutual good will need not be enlarged upon. I do, therefore, advocate, and have advocated for some time, a more defense-oriented strategy.

The argument that any innovation on our part will provoke the USSR military is not new to me. My opinion, however, is the opposite. It is difficult to imagine anything more provocative than not to respond to the very rapid increase of the military and defensive might of the USSR. Such lack of responses would dangle before the eyes of the more adventurous elements in the USSR the temptation, first, to shear the United States of discernible influence in international affairs, and then to go on to much more drastic encroachments on our way of life. One may suggest the status of Czechoslovakia or Hungary.

It is not pleasant to remember or to remind others of such fateful words as those of Marshal Sokolowski, who said, "The war will naturally end in the victory of the progressive social-economic system over the reactionary capitalist socio-economic system which is historically doomed to destruction. The guarantee for such an outcome of the war is the real balance between the political, economic and military forces on the two systems which has changed in favor of the socialist camp. However, victory in a future war will not come by itself. It must be thoroughly prepared for and assured."

Second, it seems to me that defense measures undertaken on our part will help rather than hinder disarmament and accommodation negotiations with the USSR. The leaders of that country are not afraid of their own weapons— why should they make any concession? If, in the words of Ernest Bevin, we enter the negotiations naked, we will leave them naked.

Third, I do not believe that defensive measures are provocative under any conditions. As for the USSR leadership, we have Premier Kosygin's words: he said, "I believe that defensive measures prevent attack and are not causing an arms race."

The same point of view was expressed even more strongly around 1963-64 in the magazines of the USSR. The discussion in these magazines expressed bewilderment that the United States did not take protective measures. They wondered: does the U.S. want to strike first? One could almost claim that the absence of true defense is considered provocative by the USSR. To avoid misunderstanding, let me repeat that I do not consider preparations for evacuation to be part of true defense.

Finally, let me consider the effect of a successful opposition to ABM on our own people and our own defense establishment. Doing nothing in the face of the now alarming USSR military buildup would give the impression that the leadership of the country does not consider

defense to be important. This would make it difficult for all of us to make sacrifices for our defense. And, let us not fool ourselves, such sacrifices will continue to be needed in the future. The effect on the military would be even worse. Not only would their plans be almost hopelessly dislocated; they would feel alienated, repudiated, and discouraged. And this is the last thing that we want. The path to peace is not an easy one: it will continue to require sacrifice, devotion, willingness to adapt to changed circumstances, and an open mind. ▲

BRIEFING (*continued from page 4*)

9. Train 20,000 auxiliary firemen;
10. Train 10,000 rescue workers;
11. Train 12,000 auxiliary policemen.

In broad terms, this is what the Emergency Measures Organization requires immediately of the government of Québec, of various departments and agencies, and of municipalities; these objectives must be achieved in 5 years, beginning in the next fiscal year.

We must, therefore, prepare in peace time what we would require in war in order to perform our role — ensuring the survival of the population.

I should now like to say a few words about the Civil Protection organization, a Québec organization for which I am responsible and whose activity parallels that of the Canada Emergency Measures Organization.

You will find among the papers which you have been given, a short document explaining the Emergency Measures Organization and defining the role which the Civil Protection organization is called on to play in this domain.

In summary, Civil Protection is charged with the coordination of emergency preparations. In addition, it acts as an intermediary between government institutions for coordination and organization; as a supervisor of the implementation of these preparations and as the controller of the funds allocated to the Emergency Measures Organization. I should add that this body, like the Canada Emergency Measures Organization, has no authority over government institutions, and that it would disappear in time of war.

I must also add that all Québec departments must provide, in their budgets for fiscal year 1970-71, amounts, under Emergency Measures, equivalent to the magnitude of the preparations for which they are responsible; a portion of these amounts is to be transferred to the Civil Protection organization budget so that the latter can assume its responsibilities.

I could say much more about Civil Protection in Québec, its structures and its place in the Canada Emergency Measures Organization, but I do not want to prolong my remarks any further. I should however, like to point out that officials of the Civil Protection organization of Québec are with us here, and I am sure that they will be pleased to discuss with you the steps that must be taken in the immediate future, along the lines that I have indicated. ▲

HURRICANE (*continued from page 16*)

Environmental Science Services Administration

The Weather Bureau, with the Department of Defense, has begun a study of ways to better predict the direction and intensity of hurricanes following Vice President Agnew's statement that Camille forecasting was inadequate.

The Environmental Science Services Administrator said the Navy Constellation aircraft used in tracking the storms, despite excellent radar equipment, could not penetrate the eye of some hurricanes; Air Force C-130's with inferior radar equipment, can enter the eye. He said several options are being considered, including exclusive use of C-130's with improved radar, developing a procedure that would allow the Constellations to enter the eye, or using a different plane entirely. Construction of a special hurricane hunter plane is not being considered at this time.

ESSA has noted that hurricane hunter planes, as well as land based radar, tracked the storm from Thursday, August 14. A Navy plane reconnoitering a tropical wave in the Caribbean that morning encountered a fast-developing depression which reached storm intensity while the aircraft still was in the area. The first advisory on the new storm, which became Camille, was issued at 1:00 p.m. EDT that day by the Weather Bureau's National Hurricane Center in Miami.

The last advisory — number 20 — was issued at 11:00 a.m. CDT Monday, August 18. It reported the storm weakening as she moved northward through central Mississippi.

Department of Labor

About 350 homeless boys of the Neighborhood Youth Corps assisted local government units in Mississippi in recovery tasks as assigned by town, city and county officials.

Among the jobs performed were unloading emergency supplies from planes and trucks, assisting in the distribution of those supplies, and removing debris. They were being paid from Department Manpower Training Funds. (*to be continued*)

TELEPHONE (*continued from page 9*)

radio tower were destroyed. All Trans-Canada companies are equipped with portable emergency restoration facilities.

For example, Bell Canada, largest member of the group, has in readiness the procedures and facilities to transport and erect a 300 foot tower and establish three radio channels in each direction. This means a restoration capability of 1800 voice circuits or 600 voice circuits and two television channels.

The emergency restoration equipment comprises:

—a 40 foot tractor-trailer unit containing a 300 foot guyed tower and associated apparatus.

—two trailer units 20 feet long which house the TD2 radio and power equipment. Diesel generators to supply A.C. power are obtained from the district in which the damage occurs. All districts have generators strategically located so that they may be used during extended power failures.

Besides being able to restore microwave service in an emergency, Canadian telephone companies are also prepared for the loss of repeater stations along the many systems of "short haul" "N" and "O" carriers. Repeater offices mounted on skids are maintained at different locations. They are fully operational and when required are carried by trailer as far as possible and hauled the rest of the way on their skids. Each one can completely replace a carrier repeater station and will restore up to 720 telephone circuits.

System Compatibility

Provision of telecommunications services to Canadians by so many separate companies would be an impossibility were it not for system compatibility. The Canadian telephone network is fully integrated. This means that equipment, maintenance methods and emergency planning are uniform throughout the country. Besides special precautions insuring continuity of service, many standard features are incorporated in all companies to ensure highly reliable service. These become of utmost importance in a national emergency and shouldn't be minimized.

These features include:

- Standardization — assures compatibility between the multitude of equipment and circuits in the network and permits emergency patching over a variety of routes and facilities.
- Flexibility — plug-in units, multiple switching points and testboards permit fast restoral actions through diverse means.
- Design Margins — equipment is designed for long life and installed in buildings where it can operate unattended for long periods.
- Duplication — common control circuits such as senders and markers are duplicated and each is capable of taking over the entire load. The same applies to multiple frequency and single frequency equipment.
- Spare Facilities — trunk relay equipment, signalling units and carrier channel units are held in standby ready to take over.
- Buildings — are designed to rigid specifications and house equipment in their most protected parts.
- Power Supply — emergency and back-up power is available at all critical locations such as toll and central offices. Power distribution within an office serves equipment from alternate sources.

The telephone companies objectives are the provision of reliable, high quality, continuous service under all conditions. Survivability of telecommunications is a prime consideration in planning, operating and controlling the telephone network. It is an essential factor in determining the network's adequacy for military and civil defence purposes, or for use in situations involving natural disasters of major proportions.

Exercises, like TRANSCAN I, to evaluate the effectiveness of the network under simulated disaster conditions, are carried out from time to time. TRANSCAN I was undertaken to determine the ability of the long distance telecommunications network to survive a massive nuclear attack. The results indicated that the Canadian telecommunications network will provide a high degree of service continuity under any forseeable circumstances. ▲

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